

Refereed papers

Use of information on the shared customers of healthcare services to support care pathway planning

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ABSTRACT

Objective To describe information concerning the use of more than one type of institutional social welfare and healthcare service during one year.
Design A record linkage study based on nationwide administrative registers.
Setting The National Hospital Discharge Register covering the whole of Finland in 1995, 1997 and 1999.
Subjects The total Finnish population of 5.1 million.
Main outcome measures Discharges of the same individuals from different types of services.
Results The percentage of patients/clients using more than one type of service in 1995 and 1999 varied from 21% to 68%, depending on the type of service. High and increasing figures were found in organisations taking care of the elderly and people with multiple problems in primary healthcare institutions.
Conclusions The level of integration in the Finnish social welfare and healthcare system is high and seems to be increasing, especially in health centres. Within one year a client uses many kinds of inpatient services. This may at best represent a functioning system of care pathways and at worst mean overlapping work and lack of coordination. This information is of great importance to senior officers in care pathway planning.

Keywords: administrative registers, health services research, patient care management

Introduction

As the social and health sector is information intensive, it needs to be guided by information. However, the fundamental need for better information management capabilities in health care is at risk of being overlooked.[1]

In Finland, the practice of guidance by information, as well as guidance by regulations and guidance by resource allocation, is possible, since the municipalities have the main responsibility for social and health services. There are 448 (in 2002) municipalities in Finland, and they have a lot of autonomy in organising services. Decision makers need different types of information to be able to plan activities, such as the

functioning of care pathways (also known as service chains). Thinking in terms of care pathways is expected to increase the scope for multiprofessional planning of care and result in a greater flexibility in care arrangements.[2] A service structure may be identified by register data. Reliable information is thus a critical part of healthcare management.

There are four main factors that constitute an organisation – be it in health care or elsewhere – and define its functioning as a system: knowledge, information flows, relationships and management. Knowledge organisations are above all social entities, and their capacity for knowledge creation is determined by dynamic social processes rather than by static assets. Relationships are a common feature for all kinds of systems, mechanical, organic and dynamic.[3] In mechanical operating environments, information is accurately specified and can be expressed precisely, as explicit knowledge. However, it is difficult to define things and interpret them consistently. An organic operating environment is mainly an organisation formed by people and based on ways in which people process information. In dynamic operating environments, it is important to be able to act in a situation in which the field of knowledge is open, although explicit and tacit knowledge as such are indispensable.[4] All three systems are present in every organisation.[5]

Relationships form channels for information flows in the organisation. Information is the only source of system maintenance and renewal. In social systems the value of exchanged information is connected to its meaning, and meaning in turn arises from the organisation's primary task and chosen strategy.[3,6] Systems are always hierarchical and composed of several degrees of subsystems cooperating with each other. Data concerning the organisation's management operate as a source of systemic data.[3]

In order to facilitate the structured production of statistical information in social welfare and health care, a synthesis of knowledge hierarchy and metadata theories has been developed. 'Data' are understood as simple data elements, such as one record of discharge data with a diagnosis, derived from patient databases. When these data are linked together with definitions of data items, it is possible to create such information as the average length of stay. When this information is linked with relevant background information on the local service structure and national clinical guidelines, for instance, it is possible to create knowledge. When this knowledge is further linked with relevant background information, it may be possible to gain wisdom and true understanding of the phenomena.[7,8]

The current Finnish system of social welfare and healthcare statistics is static and one-dimensional in nature. It has been developed for the purpose of registering structures and static phenomena. National client-level registers cover the whole population (with no payer-based limitations) and concern both social welfare and healthcare services. A unique personal identifier number exists for each citizen. Being based on these personal identifier numbers, the register system produces not only a static but also a dynamic picture, as (patient-specific) information on the use of different services, for instance, in fact describes the patient's service network and interaction within this network.

There is a common acceptance of the use of the national registers for the purposes of research, and this use is regulated by clear legislation. These conditions are fulfilled only in a few countries, mainly the Nordic countries.[9] Individual-level registers on social welfare services in particular exist only in Finland. A common barrier to data use is the lack of data analysis skills.[10] Additionally, we need more research to evaluate the use of national registers for the strategic management of health services.[11]

What kind of analysis is then possible within the present statistical system? A central consideration is whether service provision to clients along different segments of the care pathway has been implemented in the best possible way or whether it results in, for instance, double or overlapping work with regard to different types of services. There are few methods available for this kind of analysis. This article will describe one method that has been developed for the purpose, and the information that can be produced by it will be examined in the light of research material. Registers on institutional care only provide indirect information on flows of clients between different institutions through data entries concerning the referring institutions and institutions for continuing care. A care pathway analysis requires a dynamic system that also registers data on outpatient care, client flows and decision making.

Shared customers

Calculating the percentage of so-called shared customers with a view of measuring the performance of one segment of the care pathway is based on available static and one-dimensional register material. The material is used for assessing client flows between social welfare and healthcare institutions and related decision making, also with regard to outpatient care.

A customer rarely gets all the services he or she needs from one professional or institution of care. However, research in the field of social welfare and health care often limits its viewpoint to one institution or group of institutions (specialised inpatient services, primary care, etc.). Sometimes this limited picture is complemented by linking survey data or other data collections to this administrative information.[12]

It is also possible to monitor the client's situation with a postal questionnaire, for instance, after he/she has left the institution. On rare occasions it has been possible to reconstruct a more complete picture of the service network used by means of records and statistics. This has been possible in certain states in Canada and in the USA for instance.[13–15]

This type of research is often based on administrative records collected for the payer of the care, does not usually cover the whole population, and leaves social welfare services untouched. The issue of analysing service networks has also been discussed in two review articles.[16,17]

There has been no comprehensive and systematic method of establishing which records belong to the same patient.[18] Some biases have been noticed within databases. Alsop and Lagney, for instance, noticed that fewer than two-thirds of all hospitalised vehicle-occupant traffic-crash victims were recorded by the police when they linked hospital data and police records.[19]

In Finland the institutions of primary health care, the health centres, produced 22% of all inpatient periods of care and 53% of all inpatient care days in 1995–97.[9,20–22] These services are mainly non-specialised and the physicians on these wards are not specialists. The level of these services, however, varies from one municipality to another, and they range from long-term care such as old people's homes to surgical services provided by specialists. These services are analysed separately here. Finnish health centres are multiprofessional organisations whose aim is to provide primary healthcare services, but they also coordinate specialist services needed by the patient. Especially in the inpatient wards of health centres, patients may have multiple health problems and their care therefore calls for a high degree of integration of different types of services.

This article presents the results of a register linkage between the Finnish Hospital Discharge Register and the Social Welfare Patient Register, both maintained by the National Research and Development Centre for Welfare and Health (STAKES). It presents an analysis of changes that have occurred in the number of shared customers in different types of institutional care, especially in primary health care. At this stage the interpretation on shared customers is information based. After longer time series it will be possible to analyse the time series in combination with metadata and to arrive at conclusions based on changes that have occurred in the structures of the service systems.

Methods

The Finnish care registers for institutional social welfare and healthcare services from the years 1995, 1997 and 1999 were used to identify shared customers. This was done by picking out all entries of the same unique personal identifier made by different service providers during the year. Together the two registers cover the whole country and all institutional and related care. The services were divided into the following groups: specialised care (medical, surgical and psychiatric wards), health centres (medical, surgical, psychiatric and general practice or non-specialised wards), private hospitals, home care, service housing, old people's homes, care for alcohol abusers and care of the mentally handicapped. Customers were identified by the unique personal identifier number that is given to each Finn at birth. The registers do not cover ambulatory care except for ambulatory surgery and home services.

The reason for selecting the years 1995, 1997 and 1999 was that client inventory data on different home services were available from these years.

Results

The number of customers has increased annually in all other service groups except the medical specialist care, medical care in health centres, specialised psychiatric care, home care and care for alcohol abusers (see Table 1). However, while the number of customers in home care was about 72 000 in 1995 and about 67 000 in 1997, it again started to grow and was about 70 000 in 1999. After 1995 there was also a marked increase (about 4000) in group care for alcohol abusers, but the increase then levelled out, and in 1999 the number was slightly lower than in 1997.

During 1995, 1997 and 1999, the following service groups showed a marked increase in the number of clients using only one type of service: psychiatric care in health care, private hospitals, service housing, old people's homes and rehabilitation (inpatient) (see Table 1).

The percentage of patients/clients using more than one type of service (that is, shared customers) varied from 21% (surgical specialised care) to 68% (medical care in primary health care) (see Figure 1). The percentage of shared customers in surgical specialties in primary health care and institutions for the mentally handicapped was also below 30. High percentages were found in organisations taking care of elderly people (primary healthcare medical specialties, unspecialised wards in health centres) and of people with multiple problems (such as old people's homes, home care).

The total number of customers is highest in the service areas of medical specialist care, surgical specialist care, unspecialised wards in health centres

Table 1 The total number of customers and the number of those using only one type of service in Finland in 1995, 1997 and 1999

Service	Customers, total			Users of only one service class		
	1995	1997	1999	1995	1997	1999
Medical specialist care	240031	243955	237152	147869	144833	136719
Surgical specialist care	410320	435024	431248	323956	341625	336793
Specialised psychiatric care	27685	25788	26254	15155	13379	13557
Psychiatric care in health centres	2307	4683	5043	1071	2351	2546
Medical care in health centres	24764	22077	21173	8732	7014	6866
Surgical care in health centres	25177	26057	26601	18290	18587	19141
Unspecialised wards in health centres	126632	135999	146001	48569	48996	50646
Private hospitals	31880	40648	42520	19787	27141	29234
Home care	71600	66878	69156	28390	25900	27392
Service housing	9790	11800	11974	4590	5450	5660
Old people's homes	41475	45665	47994	16777	17942	18943
Care for alcohol abusers	6345	10699	10582	3296	5713	5527
Care of the mentally handicapped	6937	7434	7814	5214	5440	5660
Rehabilitation (inpatient)	1933	4033	5192	1096	2329	3294

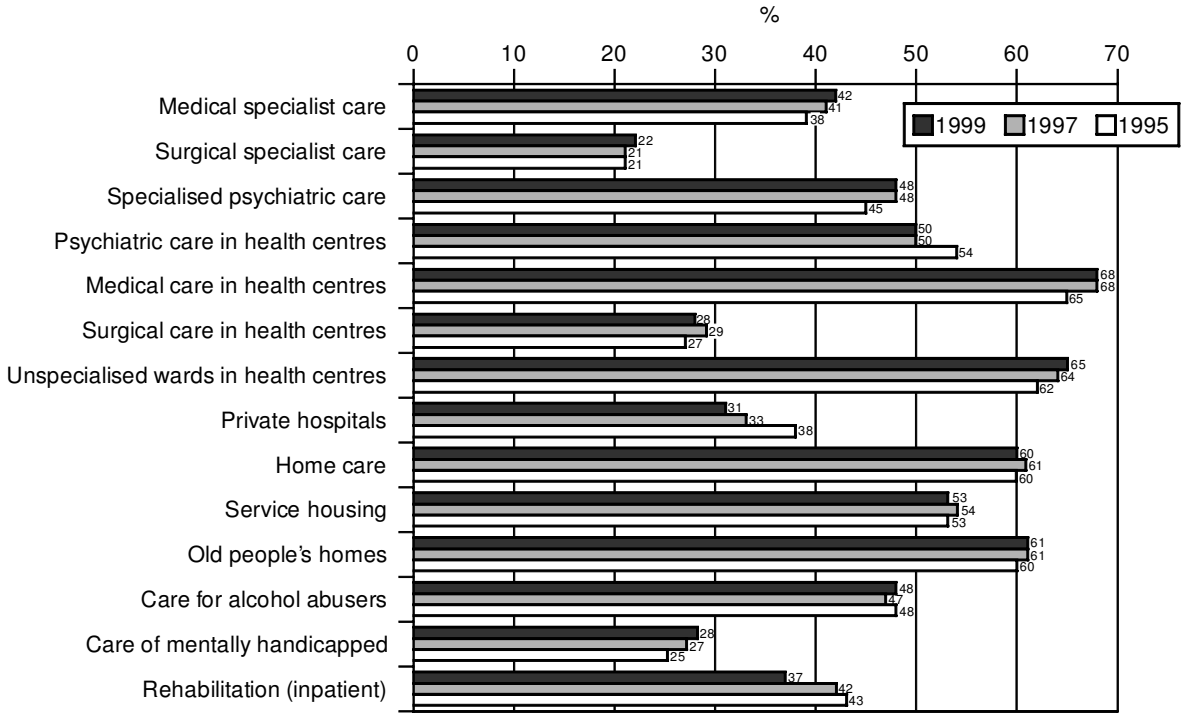

Figure 1 The percentage of customers using more than one type of the listed services (that is, shared customers) in Finland in 1995, 1997 and 1999

and home care. National-level developments in 1995–99 in the number of shared customers in these large service areas are presented in Figure 2. The number of shared customers has declined in home care only. In Figure 2, the situation in 1995 has been given the index 100 and the other years are seen in relation to it.

On analysing the occurrence of shared customers between different service types, the highest number (about 50 000 to 53 000) was found between medical and surgical specialties in specialised care during all years, although the number varied from year to year. High figures were also observed between medical specialised care and primary healthcare general practice (about 34 000 to 44 000), between surgical specialised care and primary healthcare non-specialised wards (about 31 000 to 38 000) and between home care and primary healthcare non-specialised wards (about 22 000 to 24 000).

Discussion

More research is needed to find out what kind of information is needed to support knowledge management and planning at different levels in social welfare and healthcare services.

The development of the systems also offers plenty of challenge. How should data be combined so as to obtain information on the shared customers of different institutions? The system must ensure that the professions can contribute within a common framework.[23]

The results show a high level of integration in the Finnish social welfare and healthcare system. Within one year one client uses many kinds of inpatient services. Cooperation across organisational boundaries is of great importance in medical and long-term care. The traditional forms of action, however, are very provider- or municipality-centred, focusing on the maximisation of benefits.

The method described above might also be suitable for describing the degree of 'autonomy' of a specific service type. Surgery, for instance, is an autonomous area where care pathways are less critical – in most cases there is only a need to further refine the processes of a single service provider. In contrast, care for the elderly and particularly long-term care seem to operate as part of an extensive network where there is obviously plenty of scope for rationalisation, streamlining and pruning. The method also allows an analysis of data by diagnosis, age group, and so on, and can thus identify both groups for which the development of continuity of care is most urgent and groups for which such development work is expected to yield the greatest qualitative and economic benefits. In other words, the method suits for data collection for the purposes of both service-process and care pathway refinement.

It is to be noted that this article deals with inpatient services only. In addition to this type of service, shared

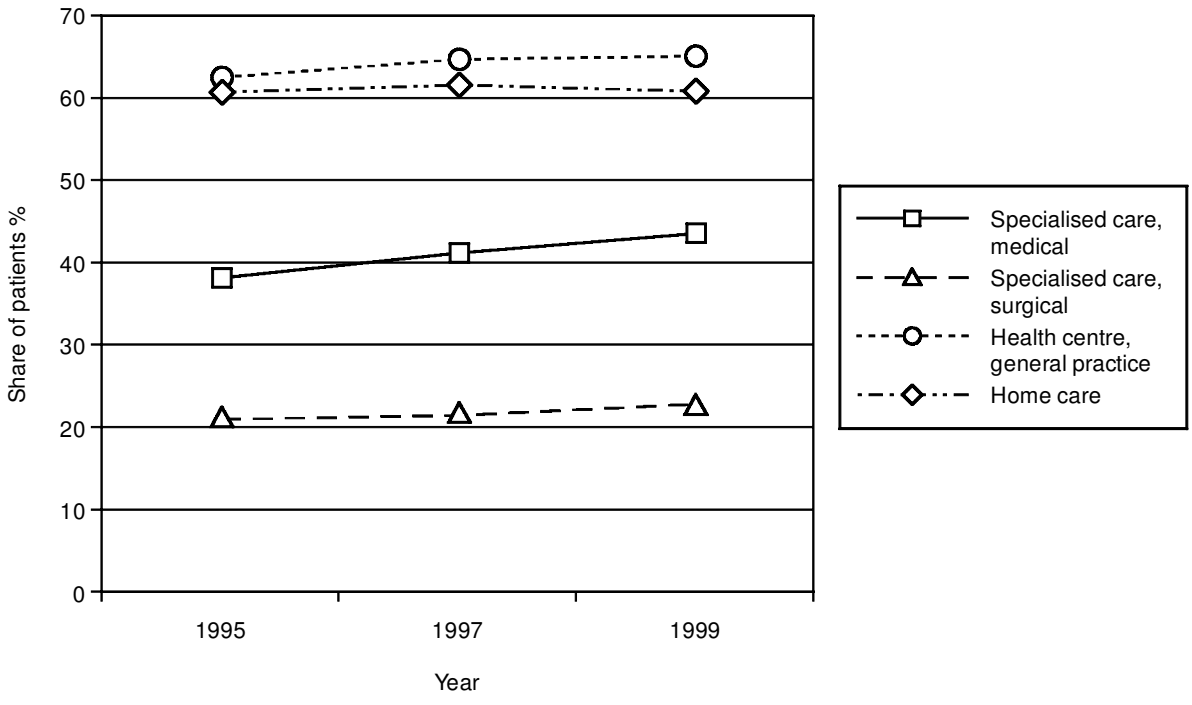

Figure 2 Areas with the highest percentages of shared customers in 1995–99 in Finland

customers may also use one or more outpatient services. In Finland, as well as elsewhere, no statistical data are presently available on these services. On the other hand, the effect of any simultaneous changes in the service structure on the figures cannot be assessed by statistical data alone.

This analysis reveals one problem of the Finnish healthcare system: the client has to move from one institution to another to get the necessary services. What may be good for the provider (specialised and concentrated services) may not be good for the user of the services. The customer may want all the services from one provider. The third party, the municipalities, who in Finland have the economic and organisational responsibility for the services, may also find it problematic to have many providers around one client and to lose control of the service network. In practice, however, the situation may not necessarily be exactly such as the statistics seem to suggest. One and the same care or service provider may appear in the statistics as several different service units, although all the services may be provided within the same organisation in a certain area. Consequently, a problem in the light of statistics is not necessarily a problem in reality. The statistical system has not necessarily been able to take notice of all changes that have taken place in the service structures.

The results also show that the picture gained by the analysis of services provided by one type of service provider or even by the whole healthcare sector may be limited. At least in Finland, the social welfare sector also uses a lot of resources for nursing and treating different health conditions. How these results can be generalised is not known, but more research is obviously needed.

Our analysis does not cover ambulatory services because we do not yet have client-level national registers on outpatient care. In Finland these services are provided mainly by municipal health centres, specialised hospitals, occupational health services and private providers. Only the last-mentioned have customer charges that are more than symbolic. The yearly number of ambulatory contacts in health care amounts to about 20 million, four contacts per Finn.

The analysis of client-level care pathways might, however, provide information that is valuable for other countries too, because the basic functions of social welfare and healthcare systems are common to all cultures. The way in which these functions are organised and financed varies from one country to another. To be able to utilise this kind of information fully, we need broad understanding of the organisational pattern. The European Union has launched a project to provide a metadata system with a view to making this task easier.

A register-based study has many economic benefits. The data needed for this kind of study or statistics already exist. In fact the data have been originally collected for patient/client purposes. There is no need to undertake an expensive survey. The probability of statistical distortion is smaller than in survey data specially collected for the purpose. However, we need to link different material with register material in order to get a broader overview of the population. The present method still needs to be developed further, as one of the datasets used describes a cross-sectional situation.

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